CLAIMS

1. A device (101) for regulating a voltage supply to a semiconductor device (100), said device comprising a memory (103) for storing a plurality of performance ranges, wherein said performance ranges are associated with a respective supply voltage; a measuring function for measuring a performance of said semiconductor device (100); and a regulator (112) wherein the device (101) is characterised in that the memory (103) stores a performance limit of the semiconductor device (100) and a reference circuit (107) is coupled to the memory (103) and is arranged to determine a lowest supply voltage required to maintain a performance of the semiconductor device (100) at a given operational frequency and modify the supply voltage to said semiconductor device (100) if a measured performance of said semiconductor device is not within a predetermined portion of said performance range associated with said voltage supplied to said semiconductor device (100).

2. A device (101) according to claim 1, wherein said performance limits stored in the memory (103) are based on two parameters: a current resistance drop value and an accuracy of the regulator (112).

3. A device (101) according to claim 1, wherein said performance range is defined to have an upper performance limit (201) such that if said measured performance of the semiconductor device (100) is above said upper performance limit (201) said regulator (112) is arranged to reduce said voltage supplied to said semiconductor device (100).

4. A device according to claim 1, wherein said performance range is defined to have a lower performance limit (202) such that if said measured performance of said semiconductor device (100) is below said lower performance limit (202) said regulator (112) is arranged to increase said voltage supplied to the semiconductor device(100).

5. A device according to claim 1, wherein said performance range is defined to have a critical lower performance limit (203) such that if said measured performance of said semiconductor device (100) is below said critical lower performance limit (203) said regulator is arranged to increase said voltage supplied to said semiconductor device.

6. A device (101) according to claim 1, wherein said measuring function is arranged to measure said performance of said semiconductor device (100) by measuring said performance of a reference circuit (107) that forms part of said semiconductor device (100).

7. A device (101) according to claim 6, wherein said plurality of performance ranges are arranged to include a performance guard margin to compensate for differences between said measured performance of said reference circuit (107) and an actual performance of a complete integrated circuit (100).

8. A device (101) according to claim 1, further comprising a ring oscillator (107), wherein said measuring function measures a frequency of said ring oscillator (107) for providing a measure of said performance of an integrated circuit (100).

9. A method for regulating a voltage supply to a semiconductor device, said method comprising storing a plurality of performance ranges of the semiconductor device (100), wherein respective performance ranges are associated with a respective supply voltage; measuring a performance of said semiconductor device; wherein the method is characterised by the step of determining a lowest supply voltage required to maintain a performance of the semiconductor device (100) at a given operational frequency and modifying said supply voltage to said semiconductor device if a measured performance of said semiconductor device is not within a predetermined portion of a performance range associated with said voltage supplied to said semiconductor device.

10. A device (101) for regulating a voltage supply to a semiconductor device (100) according to claim 1, wherein the memory (103) also stores a plurality of process temperature compensation voltage values, wherein said respective process temperature compensation voltage values are associated with a respective operational frequency for said semiconductor device (100); such that if said operational frequency of said semiconductor device (100) changes to a new operational frequency, said supply voltage is modified by said regulator to substantially a same value as said process temperature compensation voltage value associated with said new operation frequency.

11. A device (101) according to claim 10, wherein each process temperature compensation voltage value associated with a respective operational frequency is determined from a plurality of performance ranges stored in said memory (103) wherein said respective performance ranges are associated with a respective supply voltage.

12. A device (101) according to claim 11, further comprising a measuring function for measuring the performance of the semiconductor device (100), wherein said regulator (112) is arranged to modify said supply voltage to said semiconductor device (100) if a measured performance of said

semiconductor device (100) is not within a predetermined portion of a performance range associated with said voltage supplied to the semiconductor device for a given frequency.

13. A device (101) according to claim 12, wherein said performance range is defined to have an upper performance limit such that if said measured performance of said semiconductor device (100) is above said upper performance limit said regulator (112) is arranged to reduce said voltage supplied to said semiconductor device (100).

14. A device (101) according to claim 12, wherein said performance range is defined to have a lower performance limit such that if said measured performance of said semiconductor device (100) is below said lower performance limit said regulator (112) is arranged to increase said voltage supplied to said semiconductor device (100).

15. A device (101) according to claim 12, wherein said performance range is defined to have a critical lower performance limit such that if said measured performance of said semiconductor device (100) is below said critical lower performance limit said regulator (112) is arranged to increase said voltage supplied to said semiconductor device (100).

16. A device (101) according to claim 12, wherein said measuring function is arranged to measure the performance of said semiconductor device (100) by measuring said performance of a reference circuit that forms part of said semiconductor device (100).

17. A device (101) according to claim 16, wherein said plurality of performance ranges are arranged to include a performance guard margin to compensate for differences between said measured performance of said reference circuit and an actual performance of said semiconductor device (100).

18. A device (101) according to claim 12, further comprising a ring oscillator, wherein said measuring function measures a frequency of said ring oscillator for providing a measure of a performance of the semiconductor device (100).

19. A method for regulating a voltage supply to a semiconductor device, according to claim 9 wherein said set of storing comprises storing a plurality of process temperature compensation voltage values, wherein respective process temperature compensation voltage values are associated with a respective operational frequency for said semiconductor device; and said step of modifying comprises modifying a supply voltage to said semiconductor device if an operational frequency of said semiconductor device changes to a new operational frequency, wherein said supply voltage is modified to substantially a same value as a process temperature compensation voltage value associated with said new operational frequency.

20. A device (101) for regulating a voltage supply to a semiconductor device (100), said device comprising a memory (103) for storing a plurality of process temperature compensation voltage values, wherein said respective process temperature compensation voltage values are associated with a respective operational frequency for said semiconductor device (100); and a regulator (112) for modifying said supply voltage to said semiconductor device (100) if said operational frequency of said semiconductor device (100) changes to a new operational frequency, and wherein the device (101) is characterised in that the memory (103) stores a performance limit of the semiconductor device (100) and a reference circuit (107) is coupled to the memory (103) and is arranged to determine a lowest supply voltage required to maintain a performance of the semiconductor device (100) at a given operational frequency and modify said supply voltage to substantially a same value as said process temperature compensation voltage value associated with said new operational frequency,

21. A device (101) according to claim 20, wherein said performance limit stored in the memory (103) is based on a current resistance drop value and an accuracy of the regulator (112).

22. A device (101) according to claim 20, wherein each process temperature compensation voltage value associated with a respective operational frequency is determined from a plurality of performance ranges stored in said memory (103) wherein said respective performance ranges are associated with a respective supply voltage.

23. A device (101) according to claim 22, further comprising a measuring function for measuring the performance of the semiconductor device, wherein said regulator (112) is arranged to modify said supply voltage to said semiconductor device (100) if a measured performance of the semiconductor device (100) is not within a predetermined portion of a performance range associated with said voltage supplied to said semiconductor device for a given frequency.

24. A device (101) according to claim 23, wherein said performance range is defined to have an upper performance limit such that if said measured performance of said semiconductor device (100) is above said upper performance limit said regulator is arranged to reduce said voltage supplied to said semiconductor device (100).

25. A device (101) according to claim 23, wherein said performance range is defined to have a lower performance limit such that if said measured performance of said semiconductor device (100) is below said lower performance limit said regulator (112) is arranged to increase said voltage supplied to said semiconductor device (100).

26. A device (101) according claim 23, wherein said performance range is defined to have a critical lower performance limit such that if the measured performance of said semiconductor device (100) is below said critical lower performance limit said regulator (112) is arranged to increase said voltage supplied to said semiconductor device (100).

27. A device (101) according to claim 23, wherein said measuring function is arranged to measure the performance of said semiconductor device by

measuring said performance of a reference circuit that forms part of said semiconductor device (100).

28. A device (101) according to claim 27, wherein said plurality of performance ranges are arranged to include a performance guard margin to compensate for differences between said measured performance of said reference circuit and an actual performance of said semiconductor device.

29. A device (101) according to claim 23, further comprising a ring oscillator, wherein said measuring function measures a frequency of said ring oscillator for providing a measure of a performance of the semiconductor device.

30. A method for regulating a voltage supply to a semiconductor device, said method comprising storing a plurality of process temperature compensation voltage values, wherein respective process temperature compensation voltage values are associated with a respective operational frequency for said semiconductor device; and modifying a supply voltage to said semiconductor device if an operational frequency of said semiconductor device changes to a new operational frequency, wherein the method is characterised by the step of determining a lowest supply voltage required to maintain a performance of the semiconductor device (100) at a given operational frequency and modifying said supply voltage to substantially a same value as a process temperature compensation voltage value associated with said new operational frequency.